



DEPARTMENT OF MICROBIOLOGY, TUMOR AND CELL BIOLOGY

C1F2861, Biomedical Ecology - The Microbiota in Health and Disease, 1.5 credits (hec)

Biomedicinsk ekologi - mikrobiota vid hälsa och sjukdom, 1,5 högskolepoäng

Third-cycle level / Forskarnivå

Approval

This syllabus was approved by The Committee for Doctoral Education on 2023-11-06, and was last revised on 2026-05-06. The revised course syllabus is valid from spring semester 2026.

Responsible department

Department of Microbiology, Tumor and Cell Biology, Faculty of Medicine

Prerequisite courses, or equivalent

No prerequisite courses, or equivalent, demanded for this course.

Purpose & Intended learning outcomes

Purpose

To support the acquisition of a broad knowledge and systematic understanding of the composition and function of the human microbiota, how it might be related to diseases and health, and what is the potential host-microbe cross-talk. To introduce tools and methodologies that will enable the participants of the course to study the microbiota.

Intended learning outcomes

After finishing the course the student should be able to:

- describe major functions of the human-associated microbiota as the largest metabolic "organ" in the body, and reflect on its cross-talk with the host at various body sites
- explain how the microbiota is established after birth and how it changes during different stages of life
- formulate the impact of the microbiota on the development and function of the immune system
- hypothesize on how environmental factors could disturb the composition or function of the microbiota and how such changes might impact health or disease

- describe different methods to study the microbiota, including basic data analyses
- interpret findings in typical microbiota publications
- design a microbiota study

Course content

The course will cover many aspects of the composition and function of the microbiota from different body sites and during life, how it might be correlated to diseases and health, and potential host-microbe crosstalk. Sequencing techniques and principles for basic bioinformatics data analyses will be introduced and compared to biochemical methods. Hands on experience on culturing different E.coli strains from own gut microbiota will be gained. Novel findings will be discussed with lecturers in the research front-line on the translational topics of microbiota in relation to human diseases. The course is suitable for clinical and pre-clinical doctoral students and researchers for which the microbiota is of significance.

Forms of teaching and learning

The course combines lectures, student workshops, journal club discussion and practical laboratory work as follows:

- lectures by well established front-line researchers in their respective fields,
- laboratory sessions covering analysis of the students' own intestinal E. coli from gut microbiota,
- workshops/combined with focused literature studies within defined areas which will be summarized in terms of student seminars,
- Journal club discussing microbiota publications with lecturers and peers.
- peer learning using the competence of the lecturers and course attendees.

Language of instruction

The course is given in English

Grading scale

Pass (G) /Fail (U)

Compulsory components & forms of assessment

Compulsory components

Laboratory work and student seminars. Participants that are absent from the laboratory part and seminars will have to present a written paper on the subject and in agreement with the indications of the course director.

Forms of assessment

Summative examination includes laboratory work and student presentations that are evaluated by the respective tutor at the specific course module.

Course literature

Recommended literature: "The Human Microbiota in Health and Disease: An Ecological and Community-Based Approach" by Michael Wilson 2018, is recommended as an introduction to the field. The students will also receive publications and/or review articles from respective lecturer within the areas discussed. For Swedish students, we recommend; ""Magen: Bakterier, buller och brak"" by Benno P, Ernberg I, Midtvedt T, Möllby R, Norin E & Svenberg T, 2012. Additional suggested reading; ""Missing Microbes"" by Martin Blaser 2014. Links to online lecture slides will be provided during the course.